

Claims

[c1] A sheet product roll dispenser, comprising:

- a) an openable cabinet for holding a roll of spirally-wound sheet product, the spirally-wound sheet product having a free end;
- the free end being releasably held in a nip between an advance roller and a pinch roller;
- the advance roller being turned by a means for advancing the sheet through the dispenser;
- the advancing means further comprising an advance motor connected rotationally to the advance roller;
- the advance motor being started and stopped by a means for actuating the advance motor;
- the advance motor actuation means comprising the blocking of a first electromagnetic beam by a user, so that the sheet advances when the beam is blocked and stops when the beam is allowed to pass;
- b) means for cutting the sheet transversely to the direction of advancement;
- the cutting means comprising a cutter assembly driven transversely by a cut motor;
- the cut motor being controlled by a means for controlling the cut motor;

the cut motor controlling means comprising the blocking of a second electromagnetic beam by a user;

the cutter assembly further comprising a vertical cutter axle mounted between bearings in a housing, and a circular blade having a circular cutting edge mounted fixedly to the axle in concentric and perpendicular relation to the axle;

the cutter assembly slidably held by a traverse rod mounted on a first side of the sheet transverse to the direction of advancement;

the traverse rod having, at least, one park position at, at least, one end;

the cutting means further comprising a fixed blade having a straight cutting edge mounted on a second side of the sheet and transverse to the direction of advancement;

the traverse rod being mounted so as to bring the circular edge into shearing engagement with the straight edge along the entire length of the fixed blade, and so as to cut the sheet fully transversely in one pass; and

c) means for releasably clamping the sheet above and below the straight cutting edge;

the clamping means releasing the sheet only when the cutting assembly is in the park position.

[c2] The dispenser of claim 1, wherein:

said cutter assembly further comprises an upper drive roller fixedly attached to said cutter axle above and parallel to said circular blade, and a lower drive roller fixedly attached to said cutter axle below and parallel to said circular blade; and

said clamping means further comprises an upper clamping plate disposed parallel to said straight cutting edge on said first side of said sheet;

the upper clamping plate being suspended pivotably from its upper edge so that it is spaced away from said sheet when said cutter assembly is in said park position and pressed against said sheet by the upper drive roller when said cutter assembly is out of said park position; and

said clamping means further comprises a front lower clamping plate disposed parallel to, and below, the upper clamping plate, and a rear lower clamping plate disposed parallel to, and below, said straight cutting edge; the lower front and lower rear clamping plates being suspended pivotably from their upper edges so that they are spaced apart from said sheet when said cutter assembly is in said park position and the lower front clamping plate is pressed against said sheet and said sheet is in turn pressed against the lower rear clamping plate by the lower drive roller when said cutter assembly is out of said park position.

[c3] The dispenser of claim 2, wherein:
said advance motor actuation means further comprises
means for preventing motion of said cutting assembly
while said advance motor actuation means is actuated;
and
said cut motor controlling means further comprises
means for preventing actuation of said advance motor
controlling means when said cutting assembly is out of
said park position.

[c4] The dispenser of claim 3, wherein:
said cut motor controlling means further comprises
means for a) starting motion of said cutter assembly
away from said park position when said second beam is
blocked and maintaining motion of said cutter assembly
from said park position through a designated cycle re-
gardless of whether said second beam continues to be
blocked.

[c5] The dispenser of claim 4, wherein:
said cycle comprises:
a) maintaining motion of said cut motor until said cutter
assembly reaches a position on said traverse rod oppo-
site to that of said park position, whereupon
b) said cutter assembly trips a means for reversing the
motion of said cutter assembly, and

c) said cutter assembly moves back to a median position along said rod and stops.

- [c6] The dispenser of claim 5, wherein:
said cut motor controlling means further comprises means for restarting said cut motor from said median position toward said park position when said sheet is withdrawn from between said lower front clamping plate and said lower rear clamping plate.
- [c7] The dispenser of claim 6, wherein:
said restarting means further comprises a first electrical relay which responds to said lower front clamping plate coming into electrical contact with said lower rear clamping plate.
- [c8] The dispenser of claim 7, wherein:
said openable cabinet further comprises:
means for returning said cutter assembly to said park position when opening of said cabinet commences; and
means for disconnecting all electric power from the dispenser when the cabinet is fully opened.
- [c9] The dispenser of claim 8, further comprising:
means for lifting said pinch roller away from said advance roller while maintaining the axes of said pinch roller and said advance roller in parallel relation, thereby

forming a clear path between said advance roller and said pinch roller for feeding a product sheet therethrough by hand.

[c10] The dispenser of claim 9, wherein:

 said means for actuating said advance motor further comprises:

 a first electronic amplifier for amplifying a first signal from a first sensor of said first electromagnetic beam, the first signal being present only when said first electromagnetic beam is blocked;

 an advance motor relay that is turned on by the amplified signal from the first electronic amplifier, causing electric power to flow through said advance motor, and turned off when the first signal is not present;

 an advance motor brake relay that brakes said advance motor dynamically by grounding said advance motor when the advance motor relay is de-energized; and

 electrical connections between the advance motor brake relay and said cut motor controlling means that prevent said cut motor actuating means from being actuated while said advance motor actuating means is actuated.

[c11] The dispenser of claim 10, wherein:

 said means for actuating said cut motor further comprises:

 a second electronic amplifier for amplifying a second

signal from a second sensor of said second electromagnetic beam, the second signal being initiated only when said second electromagnetic beam is blocked; a right hand switch mounted at said park position of said cutter assembly, a center switch mounted at said median position along said traverse rod, and a left hand switch mounted at the leftmost point of travel along said traverse rod, and a foot on said cutter assembly for tripping these switches;

a cut motor relay that is turned on by the amplified signal from the second electronic amplifier, causing said cutter assembly to move leftward from said park position, and maintained on until said foot presses the left hand switch;

a cut motor brake relay that brakes said cut motor dynamically by grounding said cut motor when the cut motor relay is de-energized, then reverses current through said cut motor until said foot presses either a) the center switch or b) the right hand switch.

[c12] The dispenser of claim 11, wherein:

 said lower rear clamping plate and said lower front clamping plate are wired electronically to comprise a clamp switch that is in the open position when either a) said product sheet is held between them, or b) said cutter assembly is in said park position; and

the clamp switch uses a low voltage source to energize a clamp plate relay, which is connected to re-energize said cut motor relay.

- [c13] The dispenser of claim 12, wherein:
said traverse rod is mounted within said cabinet on two springs, one at either end of said traverse rod and biasing said traverse rod in a horizontal direction towards said lower rear clamping plate, so as to press said upper and lower drive rollers with constant force at all points along said traverse rod.
- [c14] The dispenser of claim 13, wherein:
said circular blade has a first diameter, said upper drive roller has a second diameter, and said lower drive roller has a third diameter; and
the second and third diameters are less than the first diameter.
- [c15] The dispenser of claim 14, wherein:
the edge of said fixed blade is at least 4 Rockwell C units harder than the edge of said circular blade.
- [c16] The dispenser of claim 15, wherein:
said lower front clamping plate and said lower rear clamping plate further comprise cutout portions for the release of accumulated dust.

[c17] The dispenser of claim 14, wherein:
said openable cabinet further comprises:
a rectangular box divided substantially in half by an horizontal divider, forming an upper portion and a lower portion, the box also having a right side and a left side; the front of the upper space being openably covered by a door;
the door having affixed to it on either of its sides downwardly-extending arms, the arms wrapping around the outsides of the lower portion along the right and left sides, each arm having a proximal end affixed to the door and a distal end;
the door being pivotably fixed to each side by a pin near the proximal end of each arm, so that the door may open downwardly from the front of the upper space to a substantially horizontal plane, the distal ends of the arms rising to a substantially horizontal plane;
said lifting means comprising right and left L-shaped tabs affixed to the distal ends of the arms;
said pinch roller axle having a right end and a left end, each end protruding through elongate slots in the right and left sides, respectively, of the box; and
said right and left L-shaped tabs engaging and lifting the right and left ends of said pinch roller axle within the slots when said door is opened downwardly to a sub-

stantially horizontal plane.

[c18] The dispenser of claim 14, wherein:

 said openable cabinet further comprises:

 a rectangular housing into which slidingly fits a rectangular drawer;

 the drawer bounded on its sides by right and left panels;

 said pinch roller axle having a right and a left end, the ends protruding through elongate right and left slots in the panels, respectively;

 said lifting means comprising right and left crank plates being pivotably affixed to the respective panels, the crank plates having right and left L-shaped tabs, right and left tangs, and right and left springs affixed thereto, the springs biasing the crank plates rotationally so as to cause the tabs to engage the right and left ends of said pinch roller axle and lift them when the drawer is outside the housing; and

 the housing having right and left inner catches that engage the right and left tangs, respectively, on the crank plates when the drawer is inserted fully into the housing, the tangs rotating the crank plates against the spring bias and lowering said pinch roller.

[c19] 19The dispenser of claim 17, wherein:

 said returning means comprises a first switch that is held closed by one of said distal ends when said door is

closed, and opens when opening of said door commences, actuating said means for restarting said cut motor; and

said disconnecting means comprises a second switch that is open when said lifting means is disengaged from said axle, and closed by said axle when said axle is raised by said L-shaped tabs when said door is opened.

[c20] 20 The dispenser of claim 18, wherein:

said returning means comprises a third switch that is open until said axle is raised by said L-shaped tabs when said drawer is pulled out of said housing, closing the third switch and actuating said means for restarting said cut motor; and

said disconnecting means comprises a contact strip mounted on said drawer that maintains electrical contact with a power source in said housing when said drawer is within said housing, and ceases electrical contact when said drawer is withdrawn from said housing.